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ABSTRACT

It was hypothesized that college students' metacognitive behaviors would predict their reading achievement scores. Nelson-Denny Reading Tests scores were obtained for each of 66 students in undergraduate reading methods courses, and these students were asked to introspect about their behavior as they read an article related to course work. Becoming distracted and rereading were by far the most frequently mentioned behaviors. A regression equation that explained 59.8% of the variation in raw scores contained the five predictor variables reading for meaning, rereading, selectively reading, adjusting reading speed, and behavior (a variable used to check whether the number of behaviors itself correlated with reading score). A second regression equation containing only the four metacognitive behaviors explained 58.6% of the raw score variation. The data suggest that high scoring readers are more actively involved in reading, and that the four predictor variables discriminate between high and low reading scores. The students with higher scores were conscious of more behaviors during reading than were lower scorers. The behaviors that showed relative passivity in reading, such as becoming distracted, were neither positively nor negatively associated with reading scores, apparently occurring as natural phenomena for all readers. (RL)

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Much of the reading instruction rhetoric heard nowadays concerns the "back to basics" movement. College and university students are not exempt from the increased scrutiny applied to their reading and study skills. Unfortunately, few objective instruments exist for the purpose of tapping such students' reading and study skills. Standardized reading achievement tests such as the Nelson-Denny offer some insights about students' reading; however, they are not generally used for diagnostic projections. Many informal tests, e.g., oral reading miscue analyses, too, are relatively valueless insofar as more skilled readers, accustomed to reading silently, are concerned. For these reasons, the authors employed an introspection/retrospection technique to find out what good and poor readers think they do when they read.

A growing body of literature on metacognition -- knowing what it is that one knows -- supports the validity of using an introspection/retrospection technique. Judgments about one's own reading behaviors may provide a window on adults' reading comprehension processes, as oral reading miscues do for younger readers' comprehension processes. Flavell and Wellman (1977) suggest a possible causal chain of meta-memory influencing memory behavior later in development, or at least a developing coordination between the two. It is likely that the same would apply to reading; that is, awareness of one's reading behaviors may influence one's reading performance. Brown (1978b), too, suggests that whereas there is often a surprising gap between what a child says he knows and how he performs, it may be possible that this gap narrows as a person reaches adulthood. Adulthood, therefore, may present the optimal time for a relationship between metacognitions about reading and

actual reading behavior to manifest itself.

In reading, two study areas have been identified (Olshavsky, 1977). One concerns comprehension identification: readers' understanding that they do or do not understand what they are reading. A few researchers address the comprehension identification problem (Baker, 1979; Hickman, 1977; Myers & Paris, 1978). Taken together, their studies represent different perspectives on the larger comprehension identification problem. Greater sensitivity to reading-related knowledge at grade six than at grade two is demonstrated (Myers & Paris, 1978), that college students generally know when they do not understand what they are reading is suggested (Baker, 1979), and that good adult readers know they read for meaning is hinted (Hickman, 1977).

Beyond this basic self-awareness, a second study area concerns readers' awareness of behaviors they initiate when comprehension does fail. In her research, for example, Olshavsky (1977) found "...every time a subject elected re-reading as a strategy, he or she had first stated failure to understand a clause" (p. 671). Developmentally, judging from the research to date, students utilize a greater number of strategies to help them read as they grow older (Annis & Annis, 1979; Myers & Paris, 1978; Reid, 1966; Robinson, 1965), although the nature of the strategies used has not been established. From an ability grouping standpoint, definite differences between good and poor readers' perceptions exist, regarding both number and types of strategies utilized to comprehend material. Using protocol analysis, thinking aloud while solving a problem, Olshavsky (1977) found good tenth-grade readers used more strategies than poor readers, although

strategies used by both were comparable. Other research supports qualitative differences in strategy usage. Where poor readers apparently are unaware of using these strategies, good readers say they read selectively (Hickman, 1977; Robinson, 1977), hold a purpose in mind while reading (Hickman, 1977; Smith, 1967), and associate ideas read with previous experiences (Hickman, 1977; Letton, reported by Strang & Rogers, 1965). Strang and Rogers (1965) did note, however, that both high- and low-level eleventh-grade readers seemed to integrate newly-acquired ideas with their own personal development. Interestingly enough, study systems often cited in textbooks (e.g., The 3 R's for Academic Survival, OK5R, and SQ3R in Pauk's How to Study in College, 1974) advocate a variety of strategies for reading textual material -- among them, selective prereading, adjusting reading speed, rereading, and reciting -- yet, these strategies are infrequently mentioned in the metacomprehension literature.

The current picture of college students' metacognitive awareness of reading behaviors is piecemeal and tentative in nature. Existing research consists mainly of exploratory, loosely-constructed studies whose findings apply for the most part to small grups of high school students. The following study, therefore, was designed to expand the picture. Based on the available literature, then, the following expectations were generated:

1) College students will exhibit metacognitive awareness of their own reading behaviors, with regard both to the very basic awareness of the state of one's comprehension and the awareness of attendant strategies or behaviors in case of comprehension failure.

2) Mention of behaviors generally attributed to skilled reading

will be associated with higher reading achievement scores, and mention of behaviors generally attributed to unskilled reading will be associated with lower reading achievement scores. Concurrently, awareness of utilizing many behaviors, no matter which behaviors, will be associated with higher reading achievement scores, and mention of fewer behaviors will be associated with lower reading achievement scores.

Method

Subjects

Sixty-six college undergraduates in reading methods courses were recruited. Nelson-Denny Reading Test raw scores were obtained for each student; the total raw score which weighted vocabulary and comprehension subtests was used in this study. Students' scores ranged from 35 to 162, exhibiting a mean of 95 and a standard deviation of 31.26. Possible scores ranged from 0 to 172.

Materials

Each student received one copy of Durkin's (1977) "Comprehension Instruction -- Where Are You?" article, deemed appropriate for college reading methods class content.

Procedure

Following a brief introduction to the article, students were asked to read the article for meaning, while introspecting about how they were reading. An array of behavioral possibilities was offered to students in the form of specific instructions developed for introspective study, excerpted from Strang:

> As you read your selection, try to observe what you do as you read. For example, do your eyes move backward over the line of print? If so, why? Do they ever miss a line? Do you look at every single word? Do your eyes move faster than your mind? Do your thoughts wander? Where do they wander?

> Do you think of the meaning of each word or group words in phrases and thoughts?
>
> When you have finished your reading, write down immediately everything you noticed about your reading (Robinson, 1975, p. 34).

This standardized manner of jogging students' awareness was considered justifiable, for it was expected that students who read differently would retrospect differently about their reading.

Results

All retrospections mentioned by students were collected and independently categorized by two judges, following behavioral categories designated in an earlier pilot study as guidelines. Behaviors were included regardless of whether they were considered to be educationally sound or unsound. Interrater reliability of .98 indicated a high degree of agreement between the judges in categorizing the nine most frequently-mentioned behaviors.

Means and standard deviations for these behaviors are presented in Table 1.

Insert Table 1 about here

Becoming Distracted, which included comments of attention-wandering or daydreaming, was mentioned more often than any other behavior; over two-thirds of the students named this category. Rereading, mentioned by 65 percent of the students, was next in frequency. Students who wrote that they were Reading for Meaning, understanding or not understanding the text -- the hypothesized basic form of self-awareness -- represented 38 percent of the total group.

Multiple regression analyses were performed to fit an equation

which would explain the Nelson-Denny Reading Test score received by a student. Originally, the nine frequently-mentioned behaviors were entered into the analyses as potentially explanatory variables. And, to check whether the number of behaviors itself correlated with reading score, a Behavior variable was attached to the list of nine independent variables. Preliminary regressions showed certain variables to be nonsignificant predictors of variation in students' scores. These variables were eliminated, and eventually, the set of independent variables was reduced to five: Reading for Meaning, Rereading, Selectively Reading, Adjusting Reading Speed, and Behavior. In its final form, the regression equation which was able to explain 59.82 percent of the variation in the raw score appeared as follows:

$$\widehat{Score} = 61.3 + 17.8\ Meaning + 14.8\ Reread + 12.0\ Select + 19.1\ Speed + 5.6\ Behavior$$

(12.56) (2.67)*** (2.00)** (1.51)* (2.33)** (1.35)*

Because these retrospections were expected to be associated with higher raw scores, one-tailed t-tests were appropriate for determining significance. Numbers in parentheses represent t values obtained using this regression equation. One asterisk indicates significance at the 10 percent level, two asterisks at the 5 percent level, and three asterisks at the 1 percent level.

A couple examples may help to illustrate the use of this equation. If a student mentioned none of the nine frequently-mentioned behaviors whatsoever, then that student's reading score may be estimated to be 61.3. If a student mentioned both Reading for Meaning and Adjusting Reading Speed, then that student's estimated reading score may be:

$$102.3 = 61.3 + 17.8 + 12.0 + 5.6 + 5.6,$$

based on this equation. Values of 5.6 points increased this student's

score for each behavior mentioned. This is especially noteworthy in view of the fact that all nine behaviors, regardless of educational desirability, were counted in the Behavior variable.

A second regression equation was formulated which explained raw score on the basis of specific behaviors alone, eliminating the quantitative Behavior variable which was significant at the 10 percent level. Four behaviors explained 58.6 percent of the variance, as demonstrated in the following equation:

$$\hat{\text{Score}} = 62.8 = 23.3\ \text{Meaning} + 21.7\ \text{Reread} + 18.4\ \text{Select} + 25.0\ \text{Speed}$$
$$(13.15)\quad (4.37)\qquad (3.95)\qquad (2.87)\qquad (3.60)$$

Additional stepwise regression analyses demonstrated that Adjusting Reading Speed, Reading for Meaning, Rereading, and Selectively Reading retrospections contributed to 25.5, 16.1, 11.4, and 5.6 percent, respectively, of the variation in reading score. All t values are significant at the .01 level in this equation. When the 5.6 points for mention of any particular behavior is added to each behavior in the previous equation, the effects of both equations can be seen to be similar.

Discussion

College students in this study were able to report how they believed they read. In fact, students' retrospections about their reading behaviors are acute enough to significantly discriminate between high and low scores on a reading achievement test. This evidence strengthens the possibility of a causal chain between metacognitions about reading behaviors and reading behavior itself.

The data suggest that high-scoring readers are more actively involved in reading; four active behaviors -- Reading for Meaning, Rereading, Selectively Reading, and Adjusting Reading Speed -- discriminate between

high and low reading scores. Also, higher scorers are conscious of more behaviors during reading than lower scorers. Interestingly, behaviors which are marks of relative passivity in reading, that is, Becoming Distracted and Eyes Moving Faster Than Mind, are neither positively nor negatively associated with reading scores. These behaviors, although they seem like they would be decidedly detrimental to good reading, appear instead to be naturally-occurring phenomena for all readers.

Why readers retrospect differently is not yet known. As with all metacognitive data, there exists the chance that readers who score higher may only be more articulate in expressing how all readers do, in fact, read. Seeking discrepancies between how poor readers think they themselves read and how they think good readers read may help resolve this issue. If differences are perceived, perhaps intervention studies which capitalize on knowledge of good adult reading strategies may be attempted. At any rate, this study suggests an extremely practical, ecologically valid way of getting at students' reading processes.

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Table 1

Means and Standard Deviations

of Metacognitive Reading Behaviors

Behavior	Mean	Standard Deviation
Becoming distracted	.69	.46
Rereading	.65	.48
Reading for meaning/understanding	.38	.49
Tying reading to personal experience	.29	.46
Reading every word	.27	.45
Selectively reading	.24	.43
Eyes moving faster than mind	.21	.41
Adjusting reading speed	.20	.40
Chunking words	.18	.38

Note. n = 66.